

ERS Audit and Research Night

23rd November 2023



Abstracts

1. Dr Sophie Adams, ST5

Title: Outcomes of TACE; an 11 year experience at the royal infirmary Edinburgh
Supervisor: Dr James Gordon-Smith (Consultant Interventional Radiologist RIE)

Introduction

The aim of this study was to audit and statistically analyse the outcomes of patients undergoing transarterial chemoembolisation (TACE) over an eleven year period at the Royal Infirmary Edinburgh, in order to draw comparison with the outcomes published in the literature. Subgroup analysis was performed on the hepatocellular carcinoma cohort as the predominant indication for TACE. A database has been created in order to allow further prospective, precise, iterative data analysis.

Methods

A literature search was performed of published studies examining the outcomes of TACE. Caldicott approval was applied for through the Academic and Clinical Central Office for Research and Development (ref. 2196). The departmental activity from 2011-2022 was captured and stored in Excel format and filtered for TACE procedures. Individual data was gathered from Trak, PACS and hepatobiliary multidisciplinary meeting outcomes. Variables gathered included health board, age, sex, tumour size, chemotherapeutic agent and immediate complications. Post operative information including disease response, morbidity and mortality was captured through follow up imaging. Patients with multiple entries were aggregated. Procedures that were abandoned prior to chemotherapy delivery were excluded. The data was anonymised and imported into RStudio to undergo statistical analysis and to create visual representations of the data through graphs and charts.

Results

647 patients underwent 1286 TACE procedures at the Royal Infirmary Edinburgh from 06/01/11 to 29/09/22. 96.3% of all patients receiving TACE had HCC. The survival probability estimate at 1 year is 72% (95% C.I. 68, 77%). The median progression free survival was 11 months and median overall survival was 698 days (21.3 months). Cox regression model did not demonstrate a significant relationship between multifocality and overall survival (HR 1.09 (95% 0.88, 1.36) $p=0.4$). Chi squared test did not identify a relationship between sex and overall survival ($p=0.9$). Cox regression modelling investigated the outcomes of conventional TACE versus DEB-TACE on progression free survival and overall survival and found HR 1.42, (95% C.I. 1.04, 1.95) $p=0.03$ and HR 1.73 (95% C.I. 1.42, 2.36) $p<0.001$ respectively.

Conclusion

This audit has demonstrated that the outcomes achieved in TACE at the Royal Infirmary Edinburgh for HCC are comparable with those published in the literature. The creation of a database to allow prospective data collection which will underpin the practice of evidence-based interventional oncology procedures.

2. Dr Robert Cronshaw, ST3

Title: Imaging Headaches: Retrospective Analysis of Incidental Pituitary Lesions Discussed in a Neuroendocrine MDT

Supervisor: Dr Ana Casado (Consultant Neuroradiologist DCN)

Introduction

Incidental pituitary lesions are a common imaging finding (1). The optimal strategy for the long term follow up of these lesions is uncertain, especially with respect to imaging, with guidelines relying on low quality evidence (2).

Methods

We performed a retrospective, longitudinal analysis of incidental pituitary lesions discussed in a neuroendocrine MDT. Specifically, imaging was reviewed to determine the frequency and duration of follow up, the change in lesion size over the course of follow up and to determine whether predictors of lesion growth could be extracted. 69 patients were identified as meeting the inclusion criteria, of whom 58 underwent follow up imaging that was available for review.

Results

The average age was 57, with 50% female. The average initial lesion height was 14 mm and 5 (9%) individuals subsequently underwent surgical intervention. Lesion growth, as defined as height increase of > 1 mm, was observed in 16 (28%) individuals. Of these, 15 cases had lesions initially larger than 10 mm, although this relationship did not meet the threshold for statistical significance ($\chi^2 = 0.96$, $p = 0.33$). Lesion growth on final follow up study was moderately strongly correlated with growth on initial follow up study, ($r = 0.65$ and $p > 0.005$). This relationship held true on a categorical analysis of growth/no-growth on initial follow up and final follow up ($\chi^2 = 13.6$, $p < 0.005$).

Conclusion

Overall we found that long term lesion growth is moderately associated with growth on initial follow up imaging. No significant association between initial lesion size and growth was found.

1. Ezzat S et al. The prevalence of pituitary adenomas. *Cancer*. 2004;101(3):613–9. 2. Freda PU et al. Pituitary Incidentaloma: An Endocrine Society Clinical Practice Guideline. *J Clin Endocrinol Metab*. 2011 Apr;96(4):894–904.

3. Dr Hui Yen Teh, ST3

Title: US-Guided Lung Biopsy Effective and Safe Alternative to CT-Guided Lung Biopsy for Suitable Lung Lesions.

Supervisor: Dr Gillian Ritchie, Dr Jo Davis, Dr Tom Blankenstein (Consultant Radiologists RIE)

Introduction

In radiologically guided lung biopsies, the use of CT guidance is more common as US is not suitable in visualising aerated lung however US-guided lung biopsies are possible where the lung lesion contacts the pleura and/or chest wall. Since 2020, the Radiology Department in the Royal Infirmary of Edinburgh (RIE) has taken a more proactive approach in identifying smaller suitable peripheral lung lesions which can be biopsied under US-guidance with the aim of reducing the pressure on the limited CT capacity during the Covid pandemic recovery period.

Methods

A retrospective review of all lung biopsies performed in a 3-year period from January 2020 to December 2022 was carried out. The electronic health care system was reviewed to obtain information relating to the procedure, complications and outcomes. This study was compared with the preceding audit of all lung biopsies performed in January 2017 to December 2019 when only CT-guided lung biopsies were carried out.

Results

136 CT-guided biopsies and 45 US-guided biopsies were performed. The overall diagnostic rate is 82%, similar to the rate of 83% in the preceding audit. The diagnostic rate is higher for US group at 89% compared with CT group at 79% ($p = 0.18$). The overall post-procedural complication rate and pneumothorax rate are lower in the US group (2% and 2%) compared with the CT group (27% and 22%), reaching statistical significance ($p = 0.0004$, $p = 0.002$). The 45 lung lesions which were biopsied under US-guidance have saved 45-hours-worth of CT-scanning capacity which equates to 180 diagnostic CT scans, assuming a 15-minute average for each scan.

Conclusion

In suitable peripheral lung lesions, US-guided lung biopsy is an effective and safe method, demonstrating high diagnostic accuracy and lower rate of complications compared with CT-guided lung biopsy.

4. Dr Kayleigh Wood, ST3

Title: Prevalence of coronary artery and valvular calcification on outpatient abdominal CT
Supervisor: Prof Michelle C Williams (Consultant Radiologist)

Background

Coronary artery calcification is indicative of coronary arterial disease and is associated with adverse cardiovascular events and mortality. Guidelines recommend routine reporting of incidental CAC for all thoracic computed tomography (CT). We aimed to evaluate cardiac coverage on routine abdominal CT, determine the prevalence of coronary arterial and valvular calcification and assess local radiology reporting practices.

Methods

A single centre retrospective review of adult patients undergoing routine outpatient abdominal CT for non-vascular indications was performed. Extent of cardiac coverage was assessed by measuring from the junction of the inferior vena cava (IVC) and right atrium to the upper limit of the scan. The presence or absence of any coronary arterial calcification and valvular calcification were assessed visually, and radiology reports were reviewed.

Results

A total of 220 CT scans were included. Patients had a mean age of 62 ± 17 years and 45% (n=99) were male. Median cardiac coverage was 36 mm (IQR 26 – 43 mm). Coronary artery calcification was present in 33% of abdominal CT (n=72). There was no difference in the prevalence of coronary artery calcification between men and women (35% versus 31%, $p=0.544$) but it was more common in patients over 65 years (54% versus 13%, $p<0.001$). Valvular calcification was present on 11% of CT (n=23), including mitral calcification in 65% (n=15), aortic valve calcification in 26% (n=6) and both in 9% (n=2). Valvular calcification was more common in patients over 65 years (21% versus 1%, $p<0.001$). No reports mentioned coronary artery or valvular calcification.

Conclusion

Coronary arterial and valvular calcification is common on abdominal CT, but this is not currently reported.

5. Dr Olivia Anderson, ST3

Title: Dermoid cysts in infants

Supervisor: Dr Michael Jackson. (Consultant Radiologist in Paediatrics at RHCYP)

Aim/Background

Dermoid cysts are benign developmental lesions that occur on the head and neck region in children. MRI has been utilised to exclude intracranial extension prior to surgical resection, but typically requires general anaesthesia in young children. A number of cases in which GA MRI was conducted without prior ultrasound prompted review of the imaging pathway in our institution, with the objective of developing a protocol to eliminate inappropriate imaging in this context.

Methods

Retrospective analysis of all head US, MRI and CT studies performed between 01/01/2012 – 01/01/2023 containing the keyword 'dermoid' in patients younger than 3 years old was undertaken. Data was assessed to identify the diagnostic pathway performed in each case and whether there was any evidence of intracranial extension.

Results

137 studies were identified. 94 (69%) of these had US only evaluation. 100 dermoid cysts were confirmed in total, of which 71 diagnoses were made after US, 10 after MRI only, 1 dermoid cyst was confirmed on CT only and 18 were diagnosed after a combination of imaging modalities, the most common combination being MRI after US. In 26 cases the clinical diagnosis of dermoid cyst was altered following imaging, 13 of which had ultrasound alone.

Conclusion

Based on our experience and published literature we suggest that external angular dermoid cysts showing typical features do not require cross sectional imaging(1). Lesions located close to the midline may require cross-sectional imaging but ultrasound should be performed in the first instance. Low-dose, rapid acquisition CT may offer a means of excluding an associated skull defect without requirement for general anaesthesia.

6. Dr Terry Guo, ST3, Oliver Llewellyn, ST5

Title: Tandem Stents in Malignant Ureteric Obstruction: A Retrospective Review.

Supervisor: Mr Laird, Mr Blackmur (Consultant Urologists)

Introduction

Malignant ureteric obstruction (MUO) occurs in up to 4% of patients with advanced malignancy. Intervention via percutaneous nephrostomy (PCN) or ureteric stenting (US) is often undertaken with a view to improve renal function and facilitate oncological treatment, to facilitate treatment of urosepsis or electrolyte disturbance, or to better manage symptoms such as intractable pain. These interventions however may be associated with morbidity, mortality, and have quality of life implications. Tandem stenting where two ureteric stents are placed side by side within a single ureter, has been proposed as a means to improve durability compared with single stent with potential better tolerability than nephrostomy. This retrospective study aims to review the use of tandem stents in MUO in a tertiary oncology centre.

Method

Patients with MUO who underwent nephrostomy or ureteric stent placement between August 2012 and December 2016 were identified using operating theatre codes. Picture Archiving and Communication System (PACS) and electronic health records (TrakCare) were used to identify patients who had tandem stent placement. Data were collected on patient demographics, tumour characteristics, and cancer treatment intention. Primary outcomes were length of time before stent failure or death, and renal function at 3-months (with a particular reference to eGFR $>45\text{ml}/\text{min}/1.73\text{m}^2$ as a threshold to allow further chemotherapy) Stent failure was defined as urosepsis or AKI associated with hydronephrosis and requirement for conversion to nephrostomy.

Results

From a cohort of 202 patients undergoing stent or nephrostomy insertion for MUO, fifteen patients were identified who underwent tandem ureteric stent insertion, of which 6 had bilateral procedures. 6 patients had cancer of gynaecological origin, 5 of urological origin, 3 of GI origin and 1 had metastatic lung cancer. 6 were considered to have metastatic disease at time of tandem stent insertion. Obstruction was at the level of the distal ureter in 11 patients, with one additional patient having both mid and distal obstruction. Single stents alone were used in ten patients prior to their tandem stent insertion, while two patients had nephrostomy only and two patients had both single stent and nephrostomy. One patient had tandem stents as their first MUO intervention. The median duration of prior stent or nephrostomy was 45days (IQR 14-109d). Median time with tandem stents in situ was 147 days (IQR 30-385d). 4 patients had tandem stent in situ for under 30 days before either death ($n=1$) or stent failure due to sepsis or AKI ($n=3$). Of those, single stent had been in situ for median 13 days (IQR 10-19d) prior to conversion to tandem stent. 3 of these patients had mid-ureteric obstruction while the other patients was managed palliatively for locally advanced bladder cancer. The remaining 11 patients were managed by tandem stents for a median of 171 days (IQR 107-743d). Those patients had single stent or nephrostomy in situ for median 72 days (IQR 22-112d) prior to conversion to tandem stent. Of the 11 patients with tandem stent in situ for >30 days, 2 died within 3-months post intervention. Of the remaining 9 patients, 2 had eGFR $>45\text{ml}/\text{min}/1.73\text{m}^2$ at 3 months. 4 of the 9 patients had improved KDIGO class of renal failure, while 5 patients' renal function remained static or declined at 3 months.

Conclusion

We have demonstrated that tandem ureteric stents offered longer-term patency than the prior single stent or nephrostomy, however few patients have improvement in renal function, with few achieving renal function at 3 months sufficient to allow systemic oncological therapy. Our series would suggest tandem stent insertion is unlikely to be successful if preceding single stent insertion failed within 30 days.

7. Dr Nethmee Malla, ST5

Title: Complications Associated with Percutaneous Transhepatic Cholangiography a biliary drainage: a single-centre retrospective analysis.

Supervisor: Dr. James Gordon-Smith

Aim

To evaluate 30-day mortality and complication rates following percutaneous transhepatic cholangiography and biliary drainage (PTBD) procedures, and to compare local numbers with published literature.

Materials and methods

Retrospective analysis of prospectively collected data of all adult (>18 years) patients who underwent PTBD was performed, within the NHS Lothian health board, during a period of 2 years (01/01/2019 – 31/01/2020). Primary objectives were development of infectious (sepsis not attributed to other causes, cholangitis, abscess or cholecystitis) and non-infectious (bile leakage, clinically significant haemorrhage) within one week post-biliary puncture, as well as 30-day mortality. 30 day mortality as well as complication rates (within 1 week PTBD) were assessed.

Results

A total of 132 patients undergoing 137 separate biliary punctures were identified over the two year study period. There was a slight male preponderance (male:female 57.6%: 42.4%) of patients with a median age of 68.

98 patients (74%) underwent PTBD for an underlying malignant aetiology, which was most often cholangiocarcinoma. 34 patients (26%) of the study patients underwent PTBD for an underlying benign biliary stricture (ex: post-transplant hepaticojejunostomy stricture). 30-day mortality for patients with benign aetiologies was 2.9%, and 19.4% for patients with a malignant aetiology. Overall 30-day mortality was 15.2%. The rate of post-biliary puncture pancreatitis was 7.3%. The rate of infectious complications was 11.0%, and non-infectious complications was 5.9%.

Conclusion

Although both non-infectious and infectious complications are relatively common post-PTBD, our local all-cause 30-day mortality and post-procedural pancreatitis rates remain generally lower than numbers published in the literature in comparative studies. There is an established practice amongst endoscopists of administering per rectal NSAIDS in the prevention of post-ERCP pancreatitis, and it would be interesting to consider extending this to our practice as well, as would administering routine antibiotic prophylaxis for the prevention of post-PTBD biliary sepsis. Future work could also involve analysis of possible risk factors for complications.

8. Dr Laura Middleton, ST5 Radiology, Royal Hospital for Children and Young People, Edinburgh, Scotland, UK and Dr Catherine Payne, ST4 Radiology, Royal Hospital for Children and Young People, Edinburgh, Scotland, UK

Title: Assessment of CT contrast enhancement, comparing Omnipaque 300 with Omnipaque 350 within a paediatric population.

Supervisor: Dr Simon McGurk, Consultant Radiologist, Royal Hospital for Children and Young People, Edinburgh, Scotland, UK

Introduction

Omnipaque is a brand of iodinated contrast used in CT and made by GE healthcare and contains iohexol and is available in a variety of concentrations[1]. The iodine concentration affects the degree of enhancement[1] but also increases the risk of adverse reaction[2,3]. Due to the recent COVID-19 pandemic there has been a global shortage of Omnipaque 300[4,5]. Before the pandemic Omnipaque 300 was used locally as standard, at the RHCYP in Edinburgh, but was changed to Omnipaque 350 due to the supply issues. This audit aims to analyse for any difference or benefit to the increased iodine concentration.

Methods

All patients who had undergone a contrast enhanced CT with Omnipaque 300 between July 2022-November 2022 or with Omnipaque 350 between November 2022-February 2023 were included in the audit. The average attenuation in Hounsfield units was obtained at defined vascular and visceral anatomical locations. The results were analysed using a paired student T-test. Average attenuation at each location was compared to historical data from audits within the same imaging department from 2019 and 2015[6].

Results

Overall, 102 CT scans were included. Patient ages ranged from 13 days to 16 years. 80% of the scans performed were camp bastion protocol. A paired T-test was performed on data at all 7 anatomical locations, comparing average attenuation between Omnipaque 300 with Omnipaque 350. The p-Value was >0.05 in all areas except the abdominal aorta and the superior mesenteric artery. The p-Value of the SMA was 0.001 and abdominal aorta was 0.01. When comparing audit results to historical data omnipaque 350 had the highest overall average attenuation at all sampled sites, excluding the portal vein which was equal to results from 2015[6].

Conclusion

In the majority of sampled locations, the analysis did not demonstrate a statistical significance in average vascular or visceral attenuation between Omnipaque 300 and Omnipaque 350. It did however show that Omnipaque 350 has the highest average attenuation in all anatomical locations, which fits with the increased iodine content increasing enhancement[1]. It also suggests that modern protocolling and imaging techniques have been optimised[7,8] and there is overall an increased average attenuation compared to both 2019/2020 and 2015/2016.

Based on this audit it is assumed that the use of Omnipaque 350 is not impacting diagnostic imaging in a statistically significant way. It would also suggest no benefit to increasing iodine concentration long-term, should the global supply issues of Omnipaque 300 improve.